**IT Applications, Unit 4**

**Ch Developing a solution using spreadsheet software, p 192-213**

Case Study: Point Pleasant Social Service Program – organisational outline and current practice

**Designing spreadsheet solutions and output**

1. **Describe what is involved in the solution design stage**

The design stage involves planning the spreadsheet structure, any relationships between entities, the appearance of the information, creating the test plan and devising the evaluation criteria.

**Spreadsheet Design Tools**

**Elaborate under each of the following design tools:**

1. **IPO chart**

A IPO chart is used during the design process to clearly identify the solution’s input, output and processing steps required to transform the data into information.

1. **Flow chart, (list what each of the symbols mean from fig. 5-10)**

Flowcharts are used in the design process of a solution. They are used to graphically represent, in a logical order, the steps required to create a solution or a procedure to use the solution.

1. **Formula list**

A formula list shows a detailed list of formulas to be used to achieve each bit of output identified in the IPO chart.

1. **Structure chart**

A graphic representation of how the spreadsheet solution might work. The structure chart shows how more than one sheet in a workbook file are related to each other, giving the developer an overall picture of how the workbook is and how each worksheet will be used.

1. **Layout diagrams**

A layout diagram shows the basic layout of each type of worksheet in the spreadsheet solution.

It should clearly indicate:

* Type of data to be entered
* Indication of contents of each cell
* Labels
* Validation rules, including the error message to be used
* Formats and conventions that are to be used
* Headings, subheadings and instructions

**Formats and conventions, p 202-**

1. **List under each of the following subheadings the major formats and conventions that apply to spreadsheets:**
   1. **numerical information**

* Numbers are aligned to the right of the column
* Money to two decimal places
* Consistent number of decimal places
* Percentages in columns appear with the percentage symbol (%) at the top of the column rather than with the date
* Subtotals have a single line above the total
* Grand totals have a single or double line below the total
* Symbols indicating units of measure appear in the column heading rather than next to the value
* Named ranges of cells to make formulas easier to understand
  1. **financial reports**
* Space or comma to separate numbers greater than 999; 1,999 or 1 999
* Use italics to indicate addition or subtraction
* Subtotals have a single line above the totals
* $ sign in column headings rather than next to each money value
* Right alignment of dates
  1. **charts and graphs**
* Graphs and charts must have titles to identify the name if the organisation and the purpose of the graph or chart
* X-axis and Y-axis must be labelled
* Use a key if more than one set of data is used on the same graph or chart
* Include author identification and/or source of data, date and a file name (if appropriate)
* Include units of measurement on relevant axis
* Label each segment of a pie chart
* Arrange segments of a pie chart from largest to smallest (starting from 12 O’clock position)
* Include absolute figures as well as percentages on a pie chart
* Choose colours matching the information being discussed
* Use a bar chart to show the difference between values or to show change over time
* Use pie charts to compare parts of a whole or relationships between segments
* Use graphs to show trends or relationships between values on each axis
* If more than one line is used on one graph, vary the thickness or line type of each
* Limit the number of items represented in a chart to five or six
* Treat a spreadsheet printout as a report (report conventions apply)
* Suitably centre a sheet on a page
* Briefly explain the purpose of the spreadsheet and identify the author
* Clearly label what has to be entered where cells require user input
* Frame group input cells or use a suitable colour to distinguish them
* Where cells display results, clearly indicate the cell ( and the unit of measurement)
* Group or frame cells that will be printed, with cells not for printout located outside
* List all equations used in a separate document
* Include an appropriate footer to identify the file name, date and page number

1. **Describe the file naming conventions for spreadsheets**

File naming conventions for spreadsheets should indicate the purpose and any time period it covers. Each worksheet must also be given a short but meaningful name.

**Designing a macro**

1. **What is a macro?**

A macro is an automated series of tasks, usually for tasks performed frequently. Macros can be run from a key combination or a from a button added to the user interface.

**Validation**

1. **Describe each of the following types of validation used in a spreadsheet:**
   1. **Range checking**

Range checking involves checking to ensure all data falls within a certain ‘range’. This can be validated by the use of a simple IF statement with upper and lower boundaries.

* 1. **Existence checking**

A LOOKUP( ) formula can be used to check the existence of a code in another worksheet table. If the code does not exist, other formulas that would calculate totals reliant on that code being entered will not calculate until a correct code is inserted.

* 1. **Conditional formatting**

Some spreadsheet applications, such as Microsoft Excel, allow for ‘conditional formatting’, so that you can usually alert the user to an error. Microsoft Excel also has ‘data vilification’ to create pop-up error alerts.

* 1. **Data type checking**

Data type checking can be used if the data needs to be or a particular type. The alignment of data in a column provides a means of checking for correct data type. It also makes sure that integers are not decimals, or that a valid time is entered.

* 1. **Restricted data entry**

The best way to ensure that data is entered is valid, is to restrict data entry. For example, a drop down menu might appear with several choices, minimising the user’s ability to enter wrong data.

* 1. **Validation alerts**

Electric validation methods need to alert the user that the data being entered does not fit the validation rules.

**Planning to test a spreadsheet solution**

1. **What is the difference between validation and testing?**

Validation is involved with input whereas teasing is concerned with the solution itself and output. Testing can, however, also involve ensuring that electric validation works correctly.

1. **When is the test plan or test table created?**

This will occur during the design stage where the testing that will be conducted after the development stage will be planned.

1. **Attributes or properties to a spreadsheet solution that need to be tested; elaborate under each of the following testing types:**
   1. **Functionality testing**

The functionality of a system relates to the activities or actions that it was designed to carry out. When testing functionality, it is important to look at the original problem and determine if the solution meets the organisations needs.

When testing the functionality of a spreadsheet, it is wise to continuously test every formula and function to ensure that they are performing as required.

* 1. **Presentation testing**

Presentation testing involves determining the appropriate format of the solution that meets the needs of the particular audience.

Things to consider include:

* Easy to read fonts and appropriate use of white space
* Overall consistency
* Contrasting colours
* Correct labels
  1. **Usability testing**

All spreadsheets need to be user friendly and the information being conveyed also needs to be easily accessible to all users.

* 1. **Accessibility testing**

A spreadsheet solution needs to be easily accessible. Testing for the following is considered:

* Does the solution open up the right worksheet?
* Are the colours appropriate for people who are colour blind?
* Are font sizes easy to read?
  1. **Communication of message**

The important information present in the solution needs to be clear and obvious. Too much additional information can cause confusion about the purpose or the report, chart or results sheet.

**Evaluating the solution and output**

1. **What does evaluation consider?**

Evaluation considers the efficiency and effectiveness of the solution. It takes place after the solution has been implemented for a period of time, usually between three and six months.

1. **What information needs to be gathered?**

Information needs to be gathered from a variety of users to determine whether the solution is meeting the system goals.

1. **Who is best to undertake the evaluation?**

The evaluation is best completed when someone other than the developer, so that the solution is more likely to be viewed impartially.

1. **When are the evaluation criteria developed?**

The evaluation criteria are developed in the design stage of the problem solving methodology so that the system designers know which features to include.